

**Cheese-Based Coating/Filling Material for Snacking
Application**

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TECHNICAL FIELD

The present invention relates to a cheese-based preparation, particularly a savoury fat based preparation tasting of cheese and applicable for many snack product applications. It can be used as a filling or coating material providing a firm and rigid structure as known from sweet chocolate coating materials. A method of producing said cheese-based preparation is also provided.

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PRIOR ART

US patents 4,567,047 and 4,569,847 as well as EP 0 121 253 disclose cheese containing confectionary-like coatings, which are said to have a hard, glossy, confection-like texture. These coatings however contain relatively low amounts of lactose.

Based on the above disadvantages of the prior art products, there has been a desire to provide a cheese-based preparation having a shiny glance, cracking breakage behaviour, and melting smoothly on the tongue combined with a pleasant cheese taste. The texture of this product should not be grainy or sandy. The product should be a soft, cream cheese type product as known from any existing cheese snack applications.

It is an object underlying the present invention to provide a cheese-based material solving the above problems as well as a process for producing the same.

SUMMARY OF THE INVENTION

This object was surprisingly solved by means of a cheese-
5 based preparation comprising

20 to 40 % by weight lactose,
0 to 30 % by weight skim milk powder,
10 to 70 % by weight cocoa replacement fat,
10 5 to 70 % by weight cheese powder,
0 to 4 % by weight salt, and
0 to 3 % by emulsifier.

15 DETAILED DESCRIPTION OF THE INVENTION

The cheese-based preparation according to the present
invention provides a shiny glance, a cracking breakage
behaviour and melting characteristics as known from a
20 commercial chocolate product whilst providing a savoury, non-
sweet snack coating material.

The cheese-based preparation according to the present
invention contains lactose in an amount of 20 to 40 weight %,
25 preferably 32 to 37 % by weight. Thus, the cheese-based
preparation according to the present invention is
characterized by a high content of lactose as compared to the
prior art products. Lactose may work as a sugar replacer
building the dispersion in the product according to the
30 present invention. By adding lactose the fat content of the
product may be reduced.

It further contains skim milk powder in an amount of 0 to
30 % by weight, preferably 10 to 15 % by weight. Skim milk
35 powder is a standardized product which can be delivered by
almost any dairy product. Typically skim milk powder contains
34 to 36 % by weight protein, less than 1 % by weight fat, 50

to 55 % by weight lactose and 3 to 4 % by weight mineral salts. If skim milk powder is added to the preparation according to the present invention, the lactose content increases depending on the amount of skim milk powder used and its lactose content.

The content of cocoa replacement fat in the cheese-based preparation according to the present invention is 10 to 70 % by weight, preferably 20 to 40 % by weight. Suitable cocoa replacement fats include commercial products such as Biscuitine 437 / NLCBR, Coberine (Loders Crocklaan), Akomax and Akocent (Karlshamns), but are not limited to these examples.

The cheese-based preparation according to the present invention contains cheese powder in an amount of 5 to 70 % by weight, preferably 10 to 30 % by weight. Any cheese powder, such as e.g. Gouda, Cheddar, Emmentaler, can be formulated in the preparation of the invention.

The cheese-based preparation may optionally contain salt in an amount of 0 to 4 % by weight, preferably 0.5 to 1.5 % by weight.

If necessary, the cheese-based preparation according to the present invention may also contain an emulsifier in an amount of 0 to 3 % by weight, preferably 0.5 to 1.5 % by weight. Suitable emulsifiers include, but are not limited to, commercial products such as Admul Wol 1403 PGPR (Quest), Sorbitan stearates, e.g. SMS or STS (Grinsted) and Lecithin (Lucas Meyer).

In case a less sweet preparation is desired, inulin, maltodextrin type carbohydrates or any combination thereof may be added to the cheese-based preparation according to the invention in addition to the high lactose content of 20 to

40 % by weight. Other sweetness reducers like lactisole can be applied for real savoury applications.

Other ingredients such as carbohydrates, fresh cheese
5 powders, e.g. cheese powder (gouda medium) Kerry (60 %),
cream powders, cheese flavours and stabilizers can also be
added to adjust physical properties and sensorial profile of
the product. Any cream or cream cheese powder can be
employed depending on the taste required for the final
10 product. Cheese powders vary in fat and protein composition
thereby influencing the total product composition. Higher fat
powders, such as natural cheese powders having a fat content
of 50 % by weight or more, particularly preferable around
60 % by weight fat, are preferable in terms of processing and
15 taste of the final preparation according to the invention.

The cheese-based preparation of the invention may be obtained
by a process comprising the steps of:

- 20 1. Mixing lactose with part of the molten cocoa
replacement fat and refining the mixture to a
particle size of 12 to 24 μm ;
2. Refining cheese powder and optionally skim milk
powder, salt and/or emulsifier in a separate batch to
25 a particle size of 12 to 24 μm ;
3. Combining the refined powders obtained in steps 1 and
2 and exposing the mixture to a high shear treatment
whilst adding another part of the molten cocoa
replacement fat to obtain a high viscous structure;
- 30 4. Adding the residual molten cocoa replacement fat to
obtain a liquid product;
5. Tempering the product at a temperature lower than
50°C.

35 Preferably about 15 to 30 %, 5 to 20 % and 40 to 70 % by
weight of molten cocoa replacement fat based on the final

amount of cocoa replacement fat are used in step 1, step 3 and step 4, respectively.

5 Refining in steps 1 and 2 is preferably carried out using a roll refiner having 2 to 5 rolls, preferably 3 to 5 rolls. The pressure used in the refining step is preferably 0.2 to 3.5 MPa, more preferably 0.5 to 2.5 MPa. The temperature of the roll surfaces is preferably 0 to 35°C, more preferably 10 to 25°C.

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The refining treatment in steps 1 and 2 ensures a smooth and pleasant mouth feel and avoids a grainy product texture and detectable particles on the tongue. The product may optionally be refined in a second run at a reduced
15 temperature to further improve the smooth product texture.

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In step 3, the two refined powder mixtures are combined and exposed to high shear treatment in an apparatus, such as a mixer, whilst adding a part of the residual molten fat to get a dough-like high viscous structure. The high viscous structure of the blend is required to homogenously distribute and stabilize the fat phase by means of shear and, if necessary, usage of emulsifiers. Refining and high shear treatment provides the smooth, chocolate-like mouth feel,
25 such as the melting properties and not being grainy and further contributes to the desired breakage behaviour of the stiffened cheese-based preparation according to the invention.

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The high viscous product is exposed to shear treatment for a time sufficient to provide desired sensorial and physical characteristics. The time for the shear treatment may vary depending on the type of carbohydrates, cheese powder and fat, but may be selected appropriately by the person skilled
35 in the art without any undue burden. The combined mixture of the refined powders is suitably subjected to the high shear treatment. The time necessary for the high shear treatment

is dependent on the type of device used. A suitable time span may be between 5 and 15 min.

In step 4, the residual molten cocoa replacement fat is successively added and the product gets liquid.

Subsequently, the product is tempered in step 5 under conditions similar to the ones of chocolate processing depending on the type of fat used. For the cheese-based preparation making, it was however found to be crucial that the temperature is lower than 50°C, preferably lower than 45°C. Otherwise the cheese protein particles start coagulating leading to an irreversible destroyed and inhomogeneous structure of the product.

A particular preferred embodiment of the process of the present invention comprises the steps of:

1. Mixing lactose with 15 to 30 % of the molten cocoa replacement fat and refining the mixture to a particle size of 12 to 24 μm , wherein the refining is carried out in a roll refiner having 2 to 5 rolls, under a pressure of 0.2 to 3.5 MPa, and using a temperature of the roll surfaces of 0 to 35°C;
2. Refining cheese powder and optionally skim milk powder, salt and/or emulsifier in a separate batch to a particle size of 12 to 24 μm , wherein the refining is carried out in a roll refiner having 2 to 5 rolls, under a pressure of 0.2 to 3.5 MPa, and using a temperature of the roll surfaces of 0 to 35°C;
3. Combining the refined powders obtained in steps 1 and 2 and exposing the mixture to a high shear treatment whilst adding 5 to 20 % of the molten cocoa replacement fat to obtain a high viscous structure;
4. Adding the residual 40 to 70 % of the molten cocoa replacement fat to obtain a liquid product;

5. Tempering the product at a temperature lower than 50°C.

5 The cheese-based preparation according to the present invention may be used for filling and coating of any type of food, such as biscuits, rice wafers rice crisps, nuts, pralines, crackers.

10 The present invention is illustrated by the following non-limiting example. All percentages are indicated as % by weight based on the final preparation unless stated otherwise.

15 EXAMPLE

To manufactured a cheese-based preparation 35.4 % lactose and 8.5 % of molten cocoa replacement fat were mixed in a Hobart Mixer (Type A 200), speed II, for approximately 5 to 15 min.

20 Subsequently the mixture was refined to a particle size of 12 to 24 μm in a 3 Roll Refiner (Type Bühler, pilot plant size - roll diameter 150 mm, pressure 18 bar, Temp. 20°C). 19.2 % of cheese powder and 13.6% of skim milk powder were refined in separate batches together with salt and emulsifiers to

25 obtain a particle size of 12 to 24 μm using the same parameters as given above. The refined powders were combined and subjected to a high shear treatment in a Stephan Cooker (Type UMC 5 electronic knife stirrer, speed 1500 - 2000 rpm, time 5 - 20 min). During this high shear treatment 5.75 % of

30 molten cocoa fat were added, thereby a high viscous formulation is produced. After adding further 16.2 % of molten cocoa fat and 0.23 % emulsifier a liquid product was obtained. This product was tempered manually at approximately 45-50 °C on a marble stone table. The batch

35 sizes varied between 3 and 20 kg.

The final product had the following composition (indicated as % by weight):

	35.4 %	lactose
5	13.6 %	skim milk powder
	30.4 %	cocoa replacement fat
	19.2 %	cheese powder
	0.7 %	salt
	0.7 %	emulsifier.

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The product had a shiny glance, cracking breakage behaviour and the desired melting properties.